Amendments to the Claims

1. (currently amended) A filtration system comprising:

~~a pump producing an optimized pulsed fluid flow; and~~

a dual head pump comprising a primary feed head and a secondary retentate head;

a hydraulically actuated differential pressure activated (DPA) valve; and

a filtration element;

wherein said two heads comprise different swept volumes.

2. (original) The filtration system of claim 1 wherein said pump is a diaphragm pump.

3. (canceled)

4. (canceled)

5. (currently amended) The filtration system of claim [[4]] 1 wherein said two heads provide a fixed recovery.

6. (currently amended) The filtration system of claim [[5]] 1 wherein said two heads comprise diaphragms of differing radii.

7. (currently amended) The filtration system of claim [[4]] 1 wherein said secondary retentate head is smaller than said primary feed head.

8. (currently amended) The filtration system of claim [[4]] 1 further comprising a connection between said two heads.

9. (original) The filtration system of claim 8 wherein said connection is mechanical.

10. (original) The filtration system of claim 9 wherein said connection is a shaft.

11. (canceled)

12. (original) The filtration system of claim 8 wherein a force on said secondary retentate head offsets a force on said primary feed head.

13. (canceled)

14. (currently amended) The filtration system of claim [[13]] 1 wherein said valve seals a discharge port of said retentate head when a feed pressure exceeds a retentate pressure.

15. (original) The filtration system of claim 14 wherein said valve is hydraulically activated.

16. (original) The filtration system of claim 14 wherein said connection and said valve provide a pressure recovery to said filtration system.

17. (original) The filtration system of claim 16 wherein said pressure recovery reduces energy required to operate said filtration system.

18. (original) The filtration system of claim 1 wherein said filtration element comprises a reverse osmosis element.

19. (original) The filtration system of claim 18 wherein said reverse osmosis element comprises a spiral wrapped element.

20. (original) The filtration system of claim 19 wherein said spiral wrapped element comprises:

at least one membrane; and

at least one thin feed spacer.

21. (original) The filtration element of claim 20 wherein said at least one thin feed spacer comprises a plastic web mesh.

22. (original) The filtration system of claim 20 wherein said at least one thin feed spacer is less than approximately .025 inches thick.

23. (original) The filtration system of claim 20 wherein said at least one thin feed spacer is less than approximately .011 inches thick.

24. (original) The filtration system of claim 20 wherein said at least one thin feed spacer provides for a reduction in an amount of total dissolved solids at a surface of said membrane.

25. (currently amended) The filtration system of claim 1 wherein at least one parameter of ~~said~~ an optimized pulsed fluid flow produced by said pump is determined by a configuration of said filter element.

26. (currently amended) The filtration system of claim 25 wherein said parameter ~~comprises~~ is selected from the group consisting of pulse frequency and pulse amplitude.

27. (currently amended) The filtration system of claim 25 further comprising at least one control to vary said ~~parameters~~ at least one parameter.

28. (original) The filtration system of claim 27 wherein said control is manual.

29. (original) The filtration system of claim 27 wherein said control is automatic.

30. (original) The filtration system of claim 27 further comprising at least one permeate quality monitoring device.

31. (original) The filtration system of claim 30 wherein said at least one permeate quality monitoring device comprises a flow meter.

32. (original) The filtration system of claim 30 wherein said at least one permeate quality monitoring device measures total dissolved solids.

33. (original) The filtration system of claim 32 wherein said at least one permeate quality monitoring device comprises a conductivity meter.

34. (original) The filtration system of claim 30 further comprising a feedback loop, wherein said control is varied to optimize a quality of permeate as determined by said permeate quality monitoring device.

35. (original) The filtration system of claim 34 further comprising an electrical measurement device, wherein said electrical measurement device measures an amperage load on said system.

36. (original) The filtration system of claim 35 wherein said control is varied additionally to minimize said amperage load on said system.

37. (currently amended) A method for filtering a substance comprising the steps of:

providing at least one filtration element;

providing a dual head pump which pumps a pulsed flow of the substance to the filtration element;

sealing a discharge port of a retentate head with a hydraulically actuated DPA valve when a feed pressure exceeds a retentate pressure;

varying at least one parameter of the pulsed flow to optimize a desired characteristic of permeate filtered by the filtration element and the pump.

38. (original) The method of claim 37 wherein the step of providing a pump comprises providing a diaphragm pump.

39. (canceled)

40. (currently amended) The method of claim ~~39~~ 37 wherein the step of providing a dual head pump further comprises connecting the two pump heads.

41. (canceled)

42. (canceled)

43. (currently amended) The method of claim ~~39~~ 37 wherein the step of providing a dual head

pump further comprises providing a pressure recovery.

44. (original) The method of claim 43 wherein the step of providing a pressure recovery further comprises reducing energy required to filter the substance.

45. (original) The method of claim 37 wherein the step of providing a filtration element comprises providing a reverse osmosis element.

46. (original) The method of claim 45 wherein the step of providing a reverse osmosis element comprises providing a spiral wrapped element.

47. (original) The method of claim 46 wherein the step of providing a spiral wrapped element comprises providing at least one membrane and at least one thin feed spacer in the element.

48. (original) The method of claim 47 wherein the step of providing at least one membrane and at least one thin feed spacer in the element comprises reducing the amount of total dissolved solids at a surface of the membrane.

49. (original) The method of claim 37 wherein the step of varying at least one parameter of the pulsed flow comprises varying a pulse frequency and a pulse amplitude.

50. (original) The method of claim 37 wherein the step of varying at least one parameter of the pulsed flow further comprises measuring a desired characteristic of permeate.

51. (original) The method of claim 50 wherein the step of measuring the desired characteristic of the permeate comprises measuring a permeate flow rate.

52. (original) The method of claim 50 wherein the step of measuring the desired characteristic of the permeate comprises measuring total dissolved solids in the permeate.

53. (original) The method of claim 50 wherein the step of varying at least one parameter of the pulsed flow further comprises measuring an amperage load on the pump.

54. (original) The method of claim 53 wherein the step of measuring the amperage load on the pump further comprises minimizing the amperage load on the pump.

55. (original) The method of claim 53 further comprising providing a feedback loop to automatically vary the parameter of the pulsed flow, thereby optimizing the desired characteristic of the permeate and pump.

56. (currently amended) A pressure recovery filtration system comprising:

a dual head pump comprising a primary feed head, a secondary retentate head and a single connection between the two heads;

a filtration element; and

a hydraulically actuated differential pressure activated valve;

wherein said two heads comprise different swept volumes.

57. (original) The pressure recovery filtration system of claim 56 wherein at least one of said heads comprises a diaphragm.

58. (original) The pressure recovery filtration system of claim 56 wherein said connection is mechanical.

59. (currently amended) The pressure recovery filtration system of claim 58 wherein said single connection is a shaft.

60. (canceled)

61. (original) The pressure recovery filtration system of claim 56 wherein a force on said secondary retentate head offsets a force on said primary feed head.

62. (original) The pressure recovery filtration system of claim 61 wherein said valve seals a discharge port of said retentate head when a feed pressure exceeds a retentate pressure.

63. (original) The pressure recovery filtration system of claim 62 wherein said valve comprises an inlet port connected to said retentate head and an inlet port connected to said feed head.

64. (original) The pressure recovery filtration system of claim 63 wherein said valve actuates according to a relative pressure difference between said inlet ports.

65. (new) The filtration system of claim 1 wherein said differential pressure activated valve comprises a single piston slideably disposed in a single chamber

66. (new) The method of claim 37 wherein the differential pressure activated valve comprises a single piston slideably disposed in a single chamber.

67. (new) The method of claim 39 wherein the two pump heads are connected by a single shaft.

68. (new) The pressure recovery filtration system of claim 56 wherein said differential pressure activated valve comprises a single piston slideably disposed in a single chamber